

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

(Also referred to as FORM PTO-1465)

REQUEST FOR EX PARTE REEXAMINATION TRANSMITTAL FORM

Address to:

Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: 1248-0819PUS1

Date: July 23, 2010

1. ☒ This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 7,702,323 B2
issued April 20, 2010. The request is made by:
☒ patent owner. ☐ third party requester.
2. ☒ The name and address of the person requesting reexamination is:
Michael R. Cammarata
Birch, Stewart, Kolasch & Birch, LLP
8110 Gatehouse Road, Suite 100 East, P.O. Box 747, Falls Church, VA 22040-0747
3. ☐ a. A check in the amount of \$ _____ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);
☒ b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. 02-2448; or
☐ c. Payment by credit card. Form PTO-2038 is attached.
4. ☐ Any refund should be made by ☐ check or ☐ credit to Deposit Account No. 02-2448
37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.
5. ☒ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4)
6. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
☐ Landscape Table on CD
7. ☐ Nucleotide and/or Amino Acid Sequence Submission
If applicable, items a. - c. are required.
a. ☐ Computer Readable Form (CRF)
b. Specification Sequence Listing on:
i. ☐ CD-ROM (2 copies) or CD-R (2 copies); or
ii. ☐ paper
c. ☐ Statements verifying identity of above copies
8. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.
9. ☒ Reexamination of claim(s) 1 is requested.
10. ☒ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.
11. ☒ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

[Page 1 of 2]

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.

SEND TO: Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

12. ☒ The attached detailed request includes at least the following items:
- a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1)
 - b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).
13. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)
14. ☐ a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:
- _____
- _____
- _____
- Date of Service: _____; or
- ☐ b. A duplicate copy is enclosed because service on patent owner was not possible. An explanation of the efforts made to serve patent owner is attached. See MPEP 2220.

15. Correspondence Address: Direct all communications about the reexamination to:

- ☒ The address associated with Customer Number:

02292

OR

- ☐ Firm or
Individual Name _____

Address _____

City _____

State _____

Zip _____

Country _____

Telephone _____

Email _____

16. ☐ The patent is currently the subject of the following concurrent proceeding(s):

- ☐ a. Copending reissue Application No. _____
- ☐ b. Copending reexamination Control No. _____
- ☐ c. Copending Interference No. _____
- ☐ d. Copending litigation styled: _____

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Michael R. Cammarata

Authorized Signature

Typed/Printed Name

July 23, 2010

Date

39491

Registration No.

☒ For Patent Owner Requester

☐ For Third Party Requester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/553,345

Filing Date: October 14, 2005

Inventors: Kenji SAKAMOTO

Patent No.: 7,702,323 B2

Date of Issue: April 20, 2010

For: WIRELESS CONTROL SYSTEM, CONTROL
DEVICE, CONTROLLABLE DEVICE DEVICE
CONTROL METHOD, CONTROL PROGRAM, AND
COMPUTER READABLE RECORDING MEDIUM
CONTAINING THE SAME

REQUEST FOR REEXAMINATION UNDER 37 CFR § 1.510

Mail Stop Ex Parte Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

This is a request for Ex Parte Reexamination pursuant to 37 C.F.R. § 1.510 of U.S. Patent No. 7,702,323, issued on April 20, 2010, entitled WIRELESS CONTROL SYSTEM, CONTROL DEVICE, CONTROLLABLE DEVICE DEVICE CONTROL METHOD, CONTROL PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM CONTAINING THE SAME.

The patent owner, SHARP KABUSHIKI KAISHA (hereinafter the "Requestor"), respectfully requests an Ex Parte Reexamination of claim 1 of U.S. Patent No. 7,702,323 and respectfully requests issuance of a reexamination certificate affirming the patentability of claim 1 of U.S. Patent No. 7,702,323.

The USPTO is hereby authorized to charge any fee deficiency or credit any overpayment to Deposit Account No. 02-2448.

I. REQUIREMENTS UNDER 37 C.F.R. § 1.510

As this Request satisfies each requirement of 37 C.F.R. § 1.510, the Requestor respectfully requests that the USPTO grant this reexamination a filing date pursuant to 37 C.F.R. § 1.510(d).

A. 37 C.F.R. § 1.510(a) – Required Fees

The USPTO is hereby authorized to charge the fee of \$2,520.00, as set forth in 37 C.F.R. § 1.20(c)(1), to undersigned's Deposit Account No. 02-2448. (See C.F.R. § 1.510(a).) Any additional fees may also be charged to the undersigned's Deposit Account No. 02-2448.

B. 37 C.F.R. § 1.510(b) – Ex Parte Requirements

Pursuant to 37 C.F.R. § 1.510(b), the Requestor provides an identification of claim(s) for which reexamination is respectfully requested along with an explanation of the pertinency and applicability of the prior art, a statement of SNQs, copies of prior art, and a copy of U.S. Patent No. 7,702,323. (See C.F.R. § 1.510(b).)

1. 37 C.F.R. § 1.510(b)(1) – Statement of Substantial New Questions

JP 2-226898 was made of record in a foreign application (Japanese Application No. 2004-119590) on the same day (March 2, 2010) the Issue Fee was paid in this U.S. application. JP 2-226898 was not of record in the file of U.S. Patent No. 7,702,323. JP 2-226898 discloses, *inter alia*, a remote controller that outputs an operation code for a television receiver, where the operation code is different from the operation code for a VTR (see lines 1-3 of the partial translation of JP 2-226898). Because the teachings of JP 2-226898 was not applied in any rejection of the claims during the prosecution of U.S. Patent No. 7,702,323, a substantial new question of patentability is raised by JP 2-226898.

Detailed Explanation under 37 C.F.R. § 1.510(b) for Independent Claim 1:

In the Notice of Allowance dated December 7, 2009, the Examiner states that:

“Regarding claims 1, 8, and 13, the cited prior arts, either alone or in combination, fail to teach the first command is control data transmitted to a first controlled device by the controlling device; the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device, in combination with all of other limitations in the claims.” (See Notice of Allowance dated December 7, 2009, page 2.)

JP 2-226898 discloses that “the microprocessor 10 first identifies based on the header whether or not the inputted operation code is for the television receiver 1. When the operation code is for the television receiver 1, the microprocessor 10 causes the television receiver 1 to operate in accordance with the operation code. However, if the operation code is not for the television receiver 1, the microprocessor 10 sends this operation code to the microprocessor 11 of the VTR 2 via the system cable 3” (see lines 8-16 of the partial translation of JP 2-226898).

Therefore, JP 2-226898 fails to explicitly disclose “the first command is control data transmitted to a first controlled device by the controlling device; the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.”

More specifically, JP 2-226898 only broadly discloses the use of a single “operation code” for either operating a television receiver or sending the same operation code to a VTR if the operation code was not intended for the television receiver. Therefore, at most, JP 2-226898 may be said to disclose a single code for controlling a device.

In contrast to the claimed invention of independent claim 1, JP 2-226898 fails to disclose a control command that includes one of a first command, a second command, and a third command, wherein “the first command is control data transmitted to a first controlled device by the controlling device; the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device” because JP 2-226898 merely discloses a single operation code for either operating a television receiver or for being sent to a VTR. Further, JP 2-226898 fails to even mention a total of three commands, nevertheless failing to mention the specifics of each of the three commands. Therefore, JP 2-226898 fails to make up for the deficiencies of the cited prior art in regards to independent claim 1.

Thus, independent claim 1 remains allowable and the patent remains valid.

2. 37 C.F.R. § 1.510(b)(2) – Identification of Claim(s)

In accordance with 37 C.F.R. § 1.510, reexamination of claim 1 of U.S. Patent No. 7,702,323 is respectfully requested, in view of the following reference:

Tokukaihei, Japanese Patent Application Publication No. 2-226898 (hereinafter JP 2-226898)

Reexamination of claim 1 is respectfully requested in view of JP 2-226898. U.S. Patent No. 7,702,323 is still enforceable.

37 C.F.R. § 1.510(b) through 1.510(b)(2) states that “Any request for reexamination must include...a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested.” However, MPEP 2205 states that “This would be met, for example, by a statement that the art submitted in the prior art citation under 37 CFR 1.501 was made of record in a foreign or domestic application having the same or related invention to that of the patent.”

This application claims priority to at least Japanese Application No. 2004-117292 (filed on April 12, 2004). Japanese Application No. 2004-119590 is a divisional application of the corresponding Japanese Application No. 2004-117292.

In this application, Examiner Huy D. Nguyen mailed a Notice of Allowance on December 7, 2009. Further, the Issue Fee was paid on March 2, 2010. Also on March 2, 2010, JP 2-226898 was first cited in Japanese Application No. 2004-119590.

On April 16, 2010, an Information Disclosure Statement (IDS) was submitted to the USPTO along with the Request for Continued Examination (RCE), the IDS cited JP 2-226898 on an SB/08 Form. However, through an inadvertent error, a necessary Petition to withdraw the application from issue (because the issue fee was already paid) was not filed with the RCE and IDS. U.S. Patent No. 7,702,323 issued without consideration of JP 2-226898.

Accordingly to MPEP 2205 (as stated above), the required statement would be met if “the art submitted in the prior art citation under 37 CFR 1.501 was made of record in a foreign or domestic application having the same or related invention to that of the patent.” Thus, based on the facts (as illustrated in detail above), following statement is made and is sufficient to meet the requirements under 37 CFR 1.501(b)(2):

The art submitted in the prior art citation under 37 CFR 1.501 (JP 2-226898) was made of record in a foreign application (Japanese Application No. 2004-119590) having the same or related invention to that of U.S. Patent No. 7,702,323.

3. 37 C.F.R. § 1.510(b)(3) – Prior Art

A complete listing of the prior art submitted with this Request is provided in the attached SB/08 Form, together with a copy of each listed document relied upon and accompanied by an English language translation of all the necessary and pertinent parts of any non-English language patent or printed publication. (See MPEP 2214.) The complete listing of prior art submitted includes:

Tokukaihei, Japanese Patent Application Publication No. 2-226898 (JP 2-226898) together with a partial English translation of exemplary portions of the non-English

language information that may be relevant to the issue any substantial new question(s) of patentability.

4. 37 C.F.R. § 1.510(b)(4) – Copy of U.S. Patent No. 7,702,323

A copy of the entire U.S. Patent No. 7,702,323 – including the front face, drawings, and specification/claims (in double column format) – is provided herewith. The Requestor is not aware of any reexamination certificates or disclaimers currently issued for U.S. Patent No. 7,702,323. The Requestor is not aware of any certificate of corrections currently issued for U.S. Patent No. 7,702,323.


5. 37 C.F.R. § 1.510(b)(5) – Certification

No certification is necessary in this Request for reexamination because the Request is made by the patent owner.

Requester respectfully submits that reexamination of U.S. Patent No. 7,702,323 is warranted in view of the showing in this Request that substantial new questions of patentability are presented. Early notice of the grant of this Request is earnestly solicited.

Dated: July 23, 2010

Respectfully submitted,

By 
Michael R. Cammarata
Registration No.: 39,491
BIRCH, STEWART, KOLASCH & BIRCH,
LLP
8110 Gatehouse Road, Suite 100 East
P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000



US007702323B2

(12) **United States Patent**
Sakamoto

(10) Patent No.: **US 7,702,323 B2**
 (45) Date of Patent: **Apr. 20, 2010**

(54) **WIRELESS CONTROL SYSTEM, CONTROL DEVICE, CONTROLLABLE DEVICE DEVICE CONTROL METHOD, CONTROL PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM CONTAINING THE SAME**

(75) Inventor: **Kenji Sakamoto, Chiba (JP)**

(73) Assignee: **Sharp Kabushiki Kaisha, Osaka-Shi (JP)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 485 days.

(21) Appl. No.: **10/553,345**

(22) PCT Filed: **Apr. 15, 2004**

(86) PCT No.: **PCT/JP2004/005435**

§ 371 (c)(1),
 (2), (4) Date: **Oct. 14, 2005**

(87) PCT Pub. No.: **WO2004/093485**

PCT Pub. Date: **Oct. 28, 2004**

(65) **Prior Publication Data**
 US 2006/0234659 A1 Oct. 19, 2006

(30) **Foreign Application Priority Data**

Apr. 17, 2003 (JP) 2003-112994
 Apr. 12, 2004 (JP) 2004-117292

(51) Int. Cl.
H04M 3/00 (2006.01)

(52) U.S. CL. 455/420; 455/419; 455/550.1;
 455/556.1; 455/411; 455/410

(58) Field of Classification Search 455/420,
 455/419, 550.1, 556.1, 411, 410, 422.1; 725/81
 See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,802,467 A * 9/1998 Salazar et al. 455/420
 5,901,366 A * 5/1999 Nakano et al. 455/550.1

(Continued)

FOREIGN PATENT DOCUMENTS

JP 2000-78066 A 3/2000
 JP 2000-251456 A 9/2000
 JP 2001-103336 A 4/2001

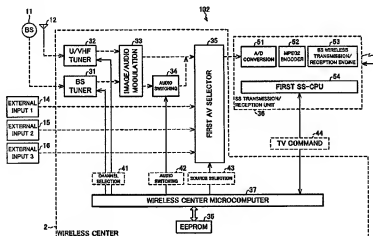
(Continued)

Primary Examiner—Joseph H Feld
 Assistant Examiner—Huy D Nguyen
 (74) Attorney, Agent, or Firm—Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

The wireless control system of the present invention constitutes a wireless AV system (101) which forms a wireless transmission network (1) in which a wireless center unit (102) and a TV main body unit (103) are connected with each other by a wireless LAN. The wireless center unit (102) transmits to the TV main body unit (103) control data having, in a control command, a discrimination code for discriminating between devices in the wireless AV system (101). The TV main body unit (103) reads out the discrimination code included in the received control data, discriminates a device to carry out the control command included in the control data, and transmits the control data to the discriminated device. As a result, even when the number of controlled devices that a controlling device has to control increases, a throughput of the controlling device for discrimination of control data does not increase, and therefore the whole system constituted of the controlling device and the controlled devices can be smoothly operated.

19 Claims, 12 Drawing Sheets



US 7,702,323 B2

Page 2

U.S. PATENT DOCUMENTS

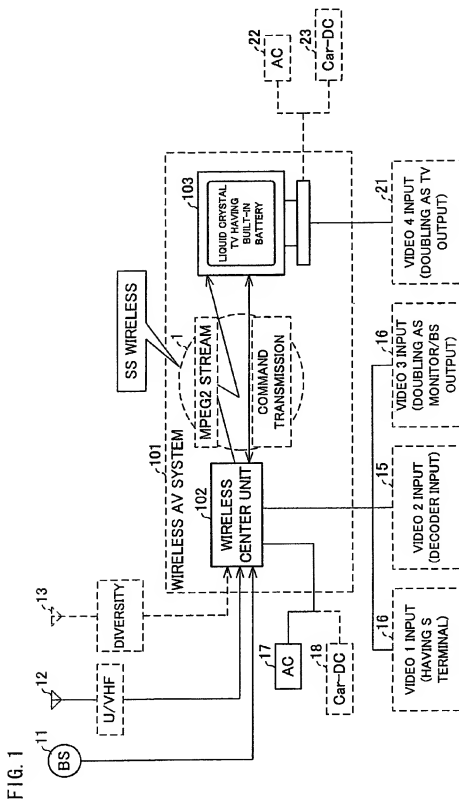
6,075,330 A * 6/2000 Terk 455/151.1
 6,542,735 B1 * 4/2003 Carley 455/420
 6,771,955 B2 * 8/2004 Imura et al. 455/420
 7,010,294 B1 * 3/2006 Pyotsin et al. 455/420
 7,035,586 B2 * 4/2006 Finet 455/7
 7,127,270 B2 * 10/2006 Sinclair 455/556.1
 7,228,122 B2 * 6/2007 Oyagi et al. 455/411
 2002/0083570 A1 7/2002 Yoshida et al.
 2002/0098834 A1 * 7/2002 Yuen 455/420
 2002/0098835 A1 * 7/2002 Flick 455/420
 2002/0109270 A1 8/2002 Swaab

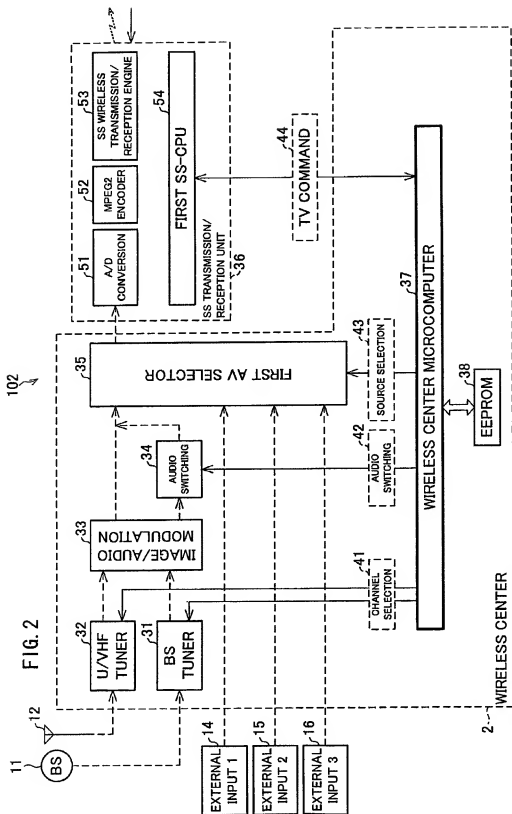
2003/0236088 A1 * 12/2003 Im 455/420
 2004/0193647 A1 9/2004 Ueda et al.

FOREIGN PATENT DOCUMENTS

JP 2002-232978 A 8/2002
 JP 2003-9261 A 1/2003
 WO WO-01/06795 A1 1/2001
 WO WO-01/10098 A1 2/2001
 WO WO-02/098060 A1 12/2002
 WO WO-03/007594 A1 1/2003

* cited by examiner





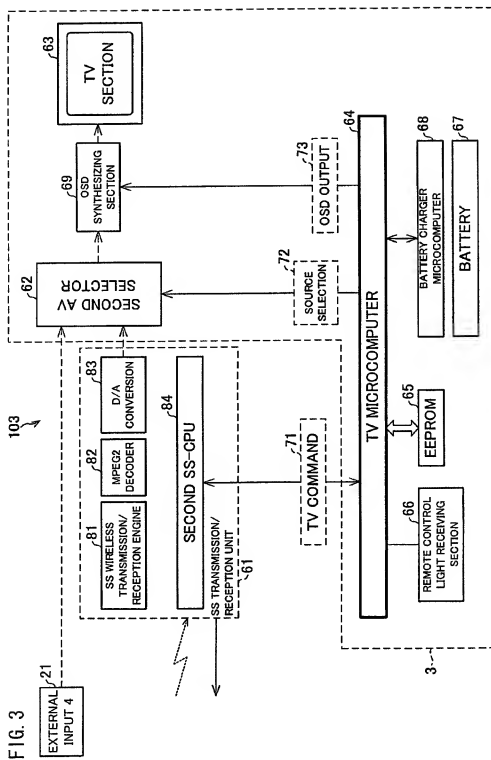


FIG. 4(a)

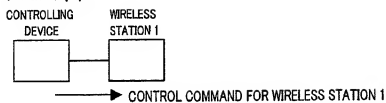


FIG. 4(b)

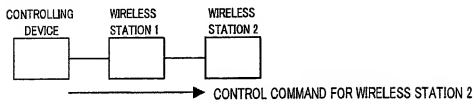


FIG. 4(c)

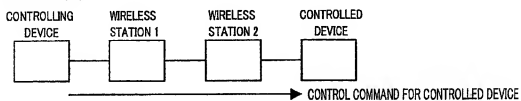


FIG. 5

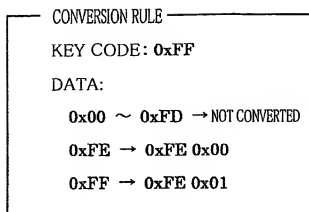


FIG. 6

EXAMPLE OF FORMAT OF CONTROL DATA

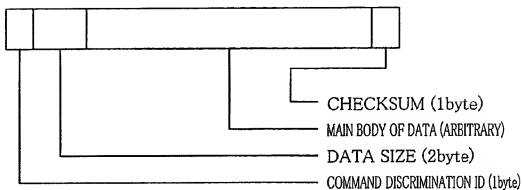


FIG. 7(a)

CONTROL COMMAND FOR WIRELESS STATION 1 (COMMAND DISCRIMINATION ID=1)

【BEFORE CONVERSION】

0x01 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x01

【AFTER CONVERSION】

0xFF 0x01 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x01

FIG. 7(b)

CONTROL COMMAND FOR WIRELESS STATION 2 (COMMAND DISCRIMINATION ID=2)

【BEFORE CONVERSION】

0x02 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x02

【AFTER CONVERSION】

0xFF 0x02 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x02

FIG. 7(c)

CONTROL COMMAND FOR CONTROLLED DEVICE (COMMAND DISCRIMINATION ID=3)

【BEFORE CONVERSION】

0x03 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x03

【AFTER CONVERSION】

0xFF 0x03 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x03

FIG. 7(d)

CONTROL COMMAND FOR EXTERNAL DEVICE (COMMAND DISCRIMINATION ID=4)

【BEFORE CONVERSION】

0x04 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x04

【AFTER CONVERSION】

0xFF 0x04 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x04

FIG. 8(a)

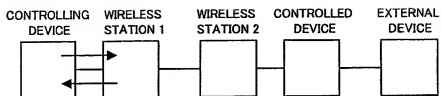


FIG. 8(b)

STRUCTURE OF
TRANSMISSION PACKET

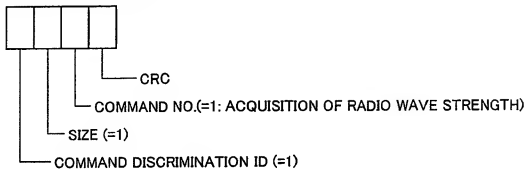


FIG. 9(a)

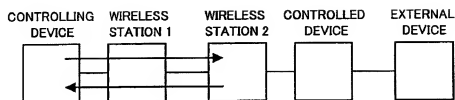


FIG. 9(b)

STRUCTURE OF
TRANSMISSION PACKET

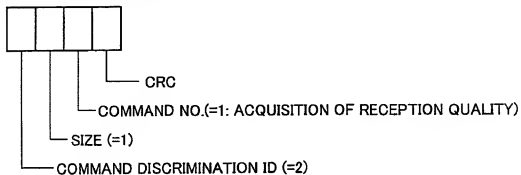


FIG. 10(a)

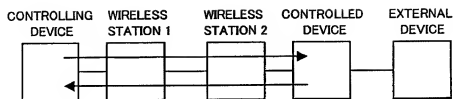


FIG. 10(b)

STRUCTURE OF
TRANSMISSION PACKET

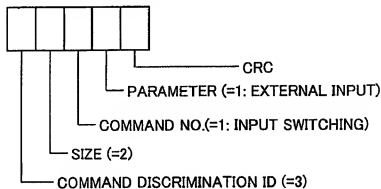


FIG. 11 (a)

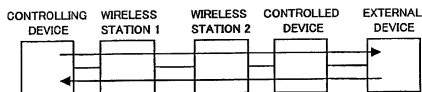


FIG. 11 (b)

STRUCTURE OF
TRANSMISSION PACKET

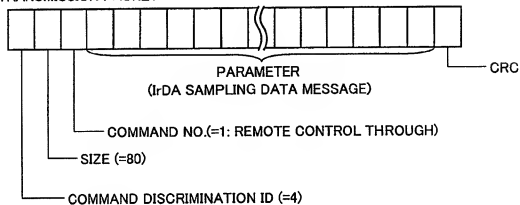
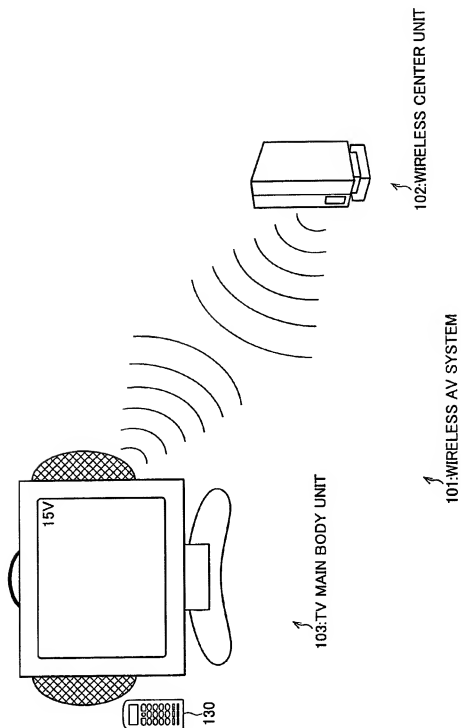
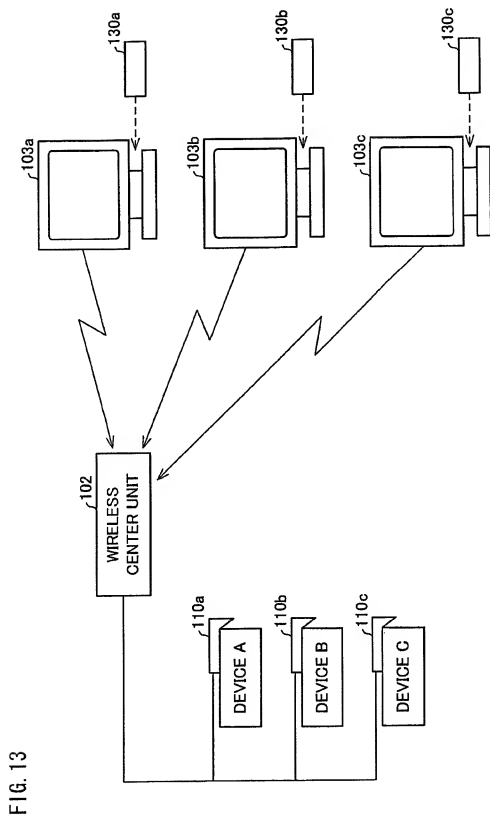


FIG. 12





1

**WIRELESS CONTROL SYSTEM, CONTROL
DEVICE, CONTROLLABLE DEVICE DEVICE
CONTROL METHOD, CONTROL PROGRAM,
AND COMPUTER READABLE RECORDING
MEDIUM CONTAINING THE SAME**

TECHNICAL FIELD

The present invention relates to: a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device; a controlling device; controlled devices; method of controlling devices; a control program; and a storage medium readable by a computer, for storing the program.

BACKGROUND ART

Recently, with the explosive prevalence of the Internet, a LAN (Local Area Network) is frequently constructed in offices, houses and the like.

Because cable wiring is troublesome, there is an increasing need for so called wireless LANs which construct a LAN wirelessly, which is aided by progress in digital wireless communication technologies. Further, wireless communication devices which constitute such a wireless LAN are expected to be used in large numbers, because the devices can be used in mobile terminals, such as notebook computers in mobile environments.

As a representative technology of the wireless LAN, there is IEEE 802.11 which has already been standardized by IEEE (Institute of Electrical and Electronics Engineers). This standardized technology defines from a physical layer to a MAC (Media Access Control) layer, being a lower layer of a data link in an OSI model, and can be replaced with Ethernet™ which is a wired LAN transmission channel. Further, IEEE 802.11 can provide a roaming function as an additional function due to being wireless.

Recently, in order to transmit/receive video image data or audio data wirelessly, a wireless AV system using such a wireless LAN is proposed.

Generally, a wireless AV system has a problem that video image data to be transmitted/received deteriorates due to transmission errors.

Patent Document 1 (PCT international publication No. WO/01/006795 (publication date; Jan. 25, 2001)) discloses an image decoding method in which a transmission error is detected by an image header included in video image data, and when a transmission error is detected, video image data is temporarily stored, repetition of a header different from the image header is detected, and based on this repeated header, temporarily stored video image data is decoded, and thereby deterioration of the video image data is prevented.

In a conventional wireless AV system, when one controlling device (such as an AV amplifier) controls a plurality of controlled devices (such as a video deck, a DVD player, a stereo, and a TV), the controlling device transmits control data by wireless to each of the controlled devices. Namely, the controlling device causes a data transmitting/receiving unit thereof to sort and transmit control data to each of the controlled devices.

As a result, the more controlled devices one controlling device has to control, the larger throughput is necessary for sorting of control data items in a data transmitting/receiving unit included in the controlling device, that is, the larger throughput is necessary for discriminating control data items, which makes it difficult for the controlling device to promptly

2

control the controlled devices, with a result that the whole of the wireless AV system does not operate smoothly.

The present invention is made in view of the foregoing problems, and its object is to realize a wireless control system in which, even when the number of controlled devices which the controlling device has to control increases, a throughput for discriminating control data in the controlling side does not increase, and the whole of the wireless AV system can be smoothly operated.

DISCLOSURE OF INVENTION

In order to solve the foregoing problem, the wireless control system of the present invention is constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, wherein the controlling device wirelessly transmits control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, the controlled devices receive the control data transmitted wirelessly from the controlling device, read out the discrimination code included in the received control data, discriminate a controlled device to carry out the control command included in the control data, and transmit the control data to the discriminated controlled device.

Further, the wireless control system is constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, wherein the controlling device includes (i) a control data generating section for generating control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, and (ii) a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication, and the controlled devices include (i) a wireless communication section for receiving the control data from the controlling device, (ii) a discrimination section for reading out the discrimination code included in the received control data and discriminating a controlled device to carry out the control command included in the control data, and (iii) a control data transmission section for transmitting the control data to the controlled device discriminated by the discrimination section.

With these arrangements, the controlling device generates control data having, in a control command, a discrimination code for discriminating between the controlled devices, and the controlled devices use the control data so as to perform discrimination of control data. As a result, even when the number of controlled devices to be controlled by one controlling device increases, a throughput for discriminating control data in the controlling device does not increase.

Therefore, even when the number of the controlled devices increases, the burden of data processing in the controlling device does not increase, so that the controlling device can promptly control each of the controlled devices. As a result, the whole of the wireless AV system can be operated smoothly.

The control data generating section may be arranged so that when generated control data includes the same data as a predetermined key code, the control data generating section

performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

In this case, misidentification of a discrimination code can be avoided, so that the controlling device can always control a suitable controlled device.

Control data generated in the control data generating section may be any one of control data to be transmitted to a control section included in the controlling device, control data to be transmitted to the wireless communication section in the controlling device, control data to be transmitted to a control section included in the controlled devices, and control data to be transmitted to the wireless communication section in the controlled devices.

Further, the control data may include, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state.

Further, the controlled devices of the wireless control system may be arranged as follows.

The controlled devices according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlled devices (i) receiving control data which includes a discrimination code for discriminating between the controlled devices in the system, and (ii) discriminating a controlled device to carry out a control command included in the control data, based on the discrimination code included in the received control data.

Further, the controlled devices according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlled devices including (i) a wireless communication section for receiving from the controlling device control data including a discrimination code for discriminating between the controlled devices in the system, (ii) a discrimination section for reading out a discrimination code included in the received control data and discriminating a controlled device to carry out a control command included in the control data, and (iii) a control data transmission section for transmitting the control data to the controlled device discriminated by the discrimination section.

Further, the controlling device of the wireless control system may be arranged as follows.

The controlling device according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlling device wirelessly transmitting control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system.

Further, the controlling device according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlling device including (i) a control data generating section for generating control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, and (ii) a

wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication.

As the wireless communication section, a communication section that transmits control data using a spread spectrum wireless system is preferably used.

Further, as the wireless communication section, a communication section that performs low power, close range, two-way wireless communication such as a wireless LAN, Bluetooth or UWB (Ultra Wide Band) is preferably used.

Note that the wireless control system may be realized by a computer. In this case, a storage medium readable by a computer, for storing a control program which realizes the wireless control system using a computer by causing the computer to function as each of the sections, is also within the scope of the present invention.

For a fuller understanding of the nature and advantages of the invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a block diagram illustrating a main structure of a wireless AV system according to an embodiment of the present invention.

FIG. 2 is a block diagram illustrating a main structure of a wireless center unit constituting the wireless AV system illustrated in FIG. 1.

FIG. 3 is a block diagram illustrating a main structure of a TV main body unit constituting the wireless AV system illustrated in FIG. 1.

FIG. 4(a) is a schematic diagram illustrating one example of transmission/reception of a control command between the wireless center unit and the TV main body unit.

FIG. 4(b) is a schematic diagram illustrating another example of transmission/reception of a control command between the wireless center unit and the TV main body unit.

FIG. 4(c) is a schematic diagram illustrating a further example of transmission/reception of a control command between the wireless center unit and the TV main body unit.

FIG. 5 is a figure illustrating one example of a key code included in control data in the wireless AV system illustrated in FIG. 1.

FIG. 6 is a figure illustrating one example of a data format of a control command transmitted/received in the wireless AV system illustrated in FIG. 1.

FIG. 7(a) is a figure illustrating one example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. 7(b) is a figure illustrating another example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. 7(c) is a figure illustrating a further example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. 7(d) is a figure illustrating a further example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. 8(a) is a schematic diagram illustrating transmission/reception of control data in a case where acquisition of transmitted radio wave strength at a wireless station is intended.

FIG. 8(b) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 8(a).

FIG. 9(a) is a schematic diagram illustrating transmission/reception of control data in a case where acquisition of received radio wave strength at a wireless station is intended.

FIG. 9(b) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 9(a).

FIG. 10(a) is a schematic diagram illustrating transmission/reception of control data in a case where switching of an external input in a controlled device is intended.

FIG. 10(b) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 10(a).

FIG. 11(a) is a schematic diagram illustrating transmission/reception of control data in a case where direct remote control of an external device via a controlled device is intended.

FIG. 11(b) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 11(a).

FIG. 12 is a figure illustrating a concrete example of the wireless AV system of the present invention.

FIG. 13 is a figure illustrating an applied example of the wireless AV system illustrated in FIG. 12.

BEST MODE FOR CARRYING OUT THE INVENTION

One embodiment of the present invention is described below with reference to the attached drawings. In the present embodiment, an example in which the wireless controlling system of the present invention is applied to a wireless AV (audio visual) system is described.

FIG. 1 is a block diagram illustrating a main structure of a wireless AV system 101 according to the present embodiment. Here, an example is illustrated in which the wireless AV system 101 is applied to a wireless TV receiving device having a separable display, as illustrated in FIG. 12.

That is, as illustrated in FIG. 12, the wireless AV system 101 is constituted of a TV main body unit 103 and a wireless center unit 102.

The TV main body unit 103 has a wireless TV receiving device including a battery, and a remote controller 130. The remote controller 130 allows remote control of a video deck or the like connected to the wireless center unit 102 via the TV main body unit 103.

Further, the wireless center unit 102 is connected with antennas for BS, U/VHF and the like, and AV devices such as a DVD player and a video deck, and image and/or audio data is wirelessly transmitted to the TV main body unit 103.

The wireless AV system 101 is fully explained below. In the following explanation, "data" means all data items transmitted/received in a general wireless AV system 101, such as control data, image data, or audio data.

As illustrated in FIG. 1, the wireless AV system 101 is constituted of the wireless center unit 102 as a base device and the TV main body unit 103 as a portable terminal. A pair of the wireless center unit 102 and the TV main body unit 103 constitutes a wireless transmission network 1.

The wireless center unit 102 and the TV main body unit 103 have functions of both a controlling device and a controlled device. That is, when the wireless center unit 102 functions as a controlling device, the TV main body unit 103 functions as a controlled device, and when the TV main body unit 103 functions as a controlling device, the wireless center unit 102 functions as a controlled device.

Here, in the wireless transmission network 1, data is transmitted/received between the wireless center unit 102 and the

TV main body unit 103 through a SS (Spread Spectrum) wireless system based on the IEEE 802.11 standard.

The wireless center unit 102 includes antenna terminals (a BS (broadcasting satellite) terminal 11, a U/VHF antenna terminal 12, and a diversity terminal 13), a video 1 input terminal having an S terminal (external input 1) 14 for connecting a device such as a digital VTR or DVD player, a video 2 input terminal (external input 2) 15 for a decoder input and a video 3 input terminal (external input 3) 16 which doubles as a monitor/BS output, and, provided as power sources, an AC power source section 17 and Car-DC power source section 18.

Note that the wireless center unit 102 is fully explained later.

The TV main body unit 103 includes a video 4 input terminal (external input 4) 21, which doubles as a TV output, for connecting a device such as a digital VTR or DVD (Digital Versatile Disc) player, and a power source terminal (not shown) to be connected with an AC power source section 22 and Car-DC power source section 23 which are provided as power sources.

The TV main body unit 103 is a thin display device that is detachable from the wireless center unit 102 and is mobile or portable because of a built-in battery. The TV main body unit 103 is a broad concept including a variety of display devices such as a liquid crystal TV, an inorganic EL (Electroluminescence) organic EL display, or a plasma display, and is not limited by its display mechanism.

Note that the TV main body unit 103 is fully explained later.

In the present embodiment, the TV main body unit 103 mainly includes a display function, an audio function and the like, and on the other hand the wireless center unit 102 mainly includes a controlling function and the like for controlling a tuner section and the TV main body unit 103. Note that in the present embodiment, the TV main body unit 103 is explained using a liquid crystal TV as an example of a thin display device. For example, a system illustrated in FIG. 13 is conceivable. FIG. 13 is explained later.

As described above, in the wireless transmission network 1 formed between the wireless center unit 102 and the TV main body unit 103, data is transmitted/received by a SS wireless method. Here, as a frequency band, the 2.4 GHz band is used. Note that recently the 5 GHz band is available as a frequency band, and the 5 GHz band may be used instead of the 2.4 GHz band.

Moving image data, DVD-Video data, or digital broadcast data is transmitted from the wireless center unit 102 to the TV main body unit 103, using an MPEG (Moving Picture Expert Group) 2 image compression format, through a communication line whose capacity is more than 10 Mbps. Further, command (controlling signal) transmission between the wireless center unit 102 and the TV main body unit 103 is performed using the SS wireless method.

Here, MPEG is explained.

When coded streams (bit rows) of MPEG video and MPEG audio, including other coded streams, are applied to a practical application, it is necessary to multiplex, synthesize, and combine the coded streams, including synchronization of the coded streams, and at the same time it is necessary to cause the streams to have a data form suitable for a format or protocol inherent in storage media or a network.

There are two kinds of MPEG2 system: one is a program stream (MPEG2-PS), which constitutes a program as with MPEG1, and the other is a transport stream (MPEG2-TS) which can constitute a plurality of programs.

An MPEG stream is a byte stream in which units such as flags (there are many 1 bit flags) and headers are ordered by 1 byte. All MPEG systems have a common data structure in which information indicative of length is disposed ahead of a data portion whose length is not fixed, and when the data portion is unnecessary, the data portion is skipped or a beginning of the next data group is located, and thereby reliable separated processing can be performed.

In order to prevent an overflow or under flow of image data and audio data on a decoding-side, it is necessary for a device which receives a compressed image and audio signal, based on an MPEG coding method, to synchronize image and audio sampling frequencies on a coding-side with image and audio sampling frequencies or STC (System Time Clock) on the decoding-side.

For that reason, a decoding device synchronizes the image and audio sampling frequencies on the coding-side with the image and audio sampling frequencies on the decoding-side by using PCR (Program Clock Reference) or SCR (System Clock Reference) which are defined by MPEG2 system standard (ISO/IEC standard 13818-1).

Here, the wireless center unit 102 and the TV main body unit 103 of the wireless AV system 101 having the above structure are fully explained below with reference to FIGS. 2 and 3.

FIG. 2 is a block diagram illustrating an outline of the wireless center unit 102 and FIG. 3 is a block diagram illustrating an outline of the TV main body unit 103.

As illustrated in FIG. 2, the wireless center unit 102 is constituted of a wireless center 2, and an SS transmission/reception unit 36 provided as communication means (communication section) for transmitting data from the wireless center 2 to the TV main body unit 103 (see FIG. 1) using the SS wireless method, and receiving a command (control command) from the TV main body unit 103.

The wireless center 2 includes: a BS tuner 31, connected with the BS terminal 11, for receiving and selecting BS broadcasting by a channel selection signal; a U/VHF tuner 32, connected with the U/VHF antenna terminal 12, for receiving and selecting U/VHF broadcasting by a channel selection signal; an image/audio demodulating section 33 for demodulating an image/audio (AV) signal received and selected by the BS tuner 31 or the U/VHF tuner 32; an audio switching section 34 for switching, according to an audio switching signal, between a received audio and information concerning TV programs such as EPG (Electrical Program Guide); a first AV selector 35 for selecting, using a source selection signal, (i) image/audio information received (ii) information concerning programs, and (iii) external input information from the video 1 input terminal 14, the video 2 input terminal (decoder input) 15, and the video 3 input terminal (which doubles as monitor/BS output) 16; a wireless center microcomputer 37 for controlling each of the sections; an EEPROM (electrically erasable programmable ROM) 38 which is an electrically rewritable non-volatile memory for storing a variety of data items such as a controlling program of the wireless center microcomputer 37, communication control data, and a communication channel changing program.

The wireless center microcomputer 37 transmits a channel selection signal 41 to the BS tuner 31 and the U/VHF tuner 32, transmits an audio switching signal 42 to the audio switching section 34, transmits a source selection signal 43 to the first AV selector 35, and transmits and receives a TV command 44 to and from the SS transmission/reception unit 36.

Further, the wireless center microcomputer 37 also serves as: a control data generating section for generating later-

mentioned control data; a discriminating section for discriminating a device to be controlled according to a discrimination code included in the control data; and a control data transmission section for transmitting the control data to the discriminated controlled device.

The channel selection signal 41 includes information for specifying a channel of a TV program. Further, the audio switching signal 42 includes information for switching audios such as main audio, sub audio, stereo, monaural and the like. Further, the source selection signal 43 includes information for selecting from an audio/image signal from an external device such as the video 1 input terminal 14 through the video 3 input terminal 16, and an audio/image signal received by the BS tuner 31 and the U/VHF tuner 32.

That is, the BS tuner 31 and the U/VHF tuner 32 accept broadcast of a program channel specified by the channel selection signal 41 from the wireless center microcomputer 37.

Further, the audio switching section 34 switches audios outputted from the image/audio demodulating section 33 to audios specified by the audio switching signal 42 from the wireless center microcomputer 37.

Further, the first AV selector 35 selects a source (an image/audio signal from an external device, such as via the video 1 input terminal 14, and an image/audio signal from the BS tuner 31 or U/VHF tuner 32) specified by the source selection signal 43 from the wireless center microcomputer 37.

Further, the TV command 44 is a control signal transmitted/received between the wireless center microcomputer 37 and the SS transmission/reception unit 36, for controlling the whole of the device.

That is, the TV command 44 is generated in the wireless center microcomputer 37 and transmitted to the SS transmission/reception unit 36, and further is transmitted to the TV main body unit 103 which is a device with which the SS transmission/reception unit 36 communicates. On the other hand, in the wireless center unit 102, the wireless center microcomputer 37 receives a TV command 71 (see FIG. 3) from the TV main body unit 103 which communicates via the SS transmission/reception unit 36.

As a result, in the TV main body unit 103, by receiving the TV command 44 from the wireless center unit 102 with which the TV main body unit 103 is in communication, each section of the TV main body unit 103 is controlled, and in the wireless center unit 102, by receiving the TV command 71 (see FIG. 3) from the TV main body unit 103 with which the wireless center unit 102 is in communication, each section of the wireless center unit 102 is controlled.

Note that in the present embodiment, the wireless center 2 having the BS tuner 31 and the U/VHF tuner 32 as a broadcast tuner is exemplified. However, the wireless center 2 may be arranged so as to have a tuner for receiving analog broadcasting, or a tuner for receiving digital broadcasting. Further, the tuner for receiving digital broadcasting may be a tuner for satellite digital broadcasting, or a tuner for terrestrial digital broadcasting.

The SS transmission/reception unit 36 is constituted of: an A/D conversion section 51 for converting data selected by the first AV selector 35 in the wireless center 2 into a digital signal; an MPEG2 encoder 52 for converting data converted into a digital signal by the A/D conversion section 51 into an MPEG2 image compression format; an SS wireless transmission/reception engine 53 constituted of an SS wireless device and wireless controlling section for transmitting transmission data (such as MPEG2 streams or commands) by the SS wire-

less method; and a first SS-CPU 54 for controlling each section of the SS transmission unit and detecting a state of radio wave.

The SS wireless transmission/reception engine 53 has: a transmitting function for transmitting an MPEG2 stream such as image and/or audio data or a command such as control data to an SS transmission/reception unit 61 (mentioned later in relation to FIG. 3) of the TV main body unit 103; and a receiving function for receiving a command such as control data from the SS transmission/reception unit 61.

Note that in the present embodiment, a program for controlling the wireless center unit 102 is stored in the EEPROM 38 so as to be rewritable. Therefore, by rewriting the program, control contents can be easily changed. The reason for storing the program for controlling the wireless center unit 102 in a rewritable memory is to avoid wasting a time for changing a mask ROM with respect to each debug in system development. Namely, by using a non-volatile memory (e.g. EPROM or EEPROM) as a program ROM, a time for developing or modifying a program is greatly reduced. Further, by downloading a program so as to rewrite program contents of the EEPROM 38, it becomes easy to upgrade or change the function.

Next, the TV main body unit 103 is fully explained below with reference to FIG. 3.

As illustrated in FIG. 3, the TV main body unit 103 is constituted of a TV main body 3, and an SS transmission/reception unit 61, which acts as communication means for transmitting a command from the TV main body 3 to the wireless center unit 102 (see FIG. 1) using the SS wireless method, and for receiving data from the wireless center unit 102.

The SS transmission/reception unit 61 transmits/receives TV commands 71 and receives an MPEG stream or command transmission data transmitted from the SS transmission/reception unit 36 of the wireless center unit 102, and decodes (restores) the received MPEG stream and the like into the original data. The SS transmission/reception unit 61 is fully explained later.

The TV main body 3 is constituted of: a second AV selector 62 for selecting between data restored by the SS transmission/reception unit 61 and an external AV signal inputted via the video 4 input terminal 21, which doubles as a TV output; a TV section 63 (a part of informing means) constituted of LCD or the like for displaying an image signal and outputting an audio signal; a TV microcomputer 64 (a part of informing means) for controlling the whole of the device, by transmitting/receiving TV commands 71 and transmitting a source selection signal 72, an OSD (On Screen Display) signal 73 and the like; an EEPROM 65 which is an electrically rewritable non-volatile memory for storing a variety of data items such as a controlling program of the TV microcomputer 64, communication control data, and a communication channel changing program; a remote control light receiving section 66 for receiving a control command in the form of light from a remote control device (not shown); a battery 67; a battery charger microcomputer 68 for controlling charging/discharging of the battery 67; and an OSD synthesizing section 69 for synthesizing an image signal outputted from the second AV selector 62 and the OSD signal 73 outputted from the TV microcomputer 64 so as to output the synthesized signal to the TV section 63.

The TV microcomputer 64 also serves as: a control data generating section for generating later-mentioned control data; a discrimination section for discriminating a controlled device according to a discrimination code included in the

control data; and a control data transmission section for transmitting the control data to the discriminated controlled device.

The SS transmission/reception unit 61 is constituted of: an SS wireless transmission/reception engine 81 constituted of an SS wireless device and wireless control section for receiving data transmitted using the SS wireless method; an MPEG2 decoder 82 for decoding a received MPEG2 stream; a D/A conversion section 83 for converting decoded data into an analog signal; and a second SS-CPU 84 (communication state detection means) for controlling each section of the SS transmission/reception unit and detecting a state of an radio wave.

The SS wireless transmission/reception engine 81 has: a receiving function for receiving an MPEG2 stream, a command or the like from the SS transmission/reception unit 36 of the wireless center unit 102; and a transmitting function for transmitting a command or the like from the SS transmission/reception unit 61.

Particularly, the second SS-CPU 84 has a function of radio wave state detection means for detecting a communication state (such as strength of an radio wave or hindrance to a communication route) between the wireless center unit 102 and the TV main body unit 103, according to an electric field strength of a received radio wave and a request for re-transmission based on an error ratio. Information indicating a state of the detected radio wave is transmitted to the TV microcomputer 64 as a TV command 71.

In the present embodiment, an arrangement is described in which the second SS-CPU 84 in the SS transmission/reception unit 61 of the TV main body unit 103 has the function of detecting the state of the radio wave. However, it may be that the first SS-CPU 54 in the SS transmission/reception unit 36 of the wireless center unit 102 has the same function and information indicating a state of a detected radio wave is transmitted as a command from the wireless center unit 102 to the TV main body unit 103. Alternatively, it may be that both the first SS-CPU 54 and the second SS-CPU 84 have the function of detecting the state of the radio wave. Further, it may be that the TV microcomputer 64 or the wireless center microcomputer 37 has the function of detecting the state of the radio wave.

The TV microcomputer 64 controls the whole of the device, and has a function of informing means for informing, based on a detected communication state, a variety of messages such as discontinuation of image/audio data, changing of a communication channel, connecting of a communication channel, and reception quality information including being outside of communication range.

Further, the TV microcomputer 64 performs communication channel changing control in which how long a communication is discontinued is measured, and the communication channel is maintained until a predetermined time passes from a time when the communication is discontinued.

Further, the TV microcomputer 64 includes an OSD generating function section, and displays information such as a program channel, time, or volume, on a screen such as a TV. It is general that an image device such as a TV and an electronic apparatus such as a TV conference system display information such as a program channel, time, or volume on a TV screen. OSD data is maintained not in the form of an image but in a form referred to as a bit map. The OSD data in the bit map form is converted into pixel values in YUV form, which represents colors by Y, Cb, and Cr, and the converted pixels are superposed on an original image of a TV broadcast or the like. The superposing is performed in the OSD synthesizing section 69.

Further, by connecting an image reproducing device (not shown) such as a DVD to the video 4 input terminal 21, which doubles as a TV output, it is possible to superpose an OSD display on a reproduced image on a display screen.

Further, the TV main body 3 may be arranged so as to include a speaker, a key input section, a slot and the like (these are not shown). The slot is for inserting a card-type external extension storage medium, and directly reading data by attaching a card type external extension storage medium to the slot. Examples of the card type external extension storage medium are an SRAM (Static RAM) card which maintains written information by power source back up; a Compact Flash (CF) made of a flash memory and the like which does not need power source back up; a smart media; a memory stick; and a micro hard disc drive (HDD), whose size is substantially the same as a Compact Flash, or which may be attached to a PC card Type II.

Further, the remote control light receiving section 66 included in the TV main body 3 is a light communication port section using IR (Infrared Rays), and receives a light signal from a remote control device for controlling a variety of operations in the TV main body unit 103 or the wireless center unit 102. To be specific, the remote control light receiving section 66 is an I/O port for performing light communication based on IrDA (Infrared Data Association), ASK and the like, which are standards used for transmission of data by infrared rays, or a wireless communication port performing communication by an radio wave.

Further, the battery 67 supplies a predetermined power to each section of the TV main body unit 103. When it is possible to charge the battery 67, the battery charger microcomputer 68 detects that, for example, the TV main body unit 103 is attached to the wireless center unit 102 or other cradle, and controls charging/discharging of a charge medium (not shown) of the battery 67 via a power supply terminal (not shown). To be specific, the battery charger microcomputer 68 stores and counts a discharged current from a battery pack, and begins charging when it judges that a remaining amount of charge in the battery pack is less than a predetermined value. In charging, the battery charger microcomputer 68 stores and counts a current charged to the battery pack, and stops charging when it judges that the battery pack is fully charged. When the TV main body 3 is separated from a commercial power source, the charged battery 67 serves as a main power source for a portable TV, and supplies power to each section of the TV main body 3.

Next, a method is explained for transmitting/receiving control data between the wireless center 2 and the TV main body 3 in the wireless AV system 101 having the above arrangement of the present embodiment.

Here, according to an input by a user, or to an action by a predetermined program, the wireless center microcomputer 37 of the wireless center unit 102 transmits control data including a discrimination code and a control command to the SS transmission/reception unit 36, the SS transmission/reception unit 61 of the TV main body unit 103, or the TV microcomputer 64 of the TV main body 3.

Here, the discrimination code is a code for discriminating which of a plurality of controlled devices the control command is for, and is generally added to a header part of control data.

The TV command 44 transmitted by the wireless center microcomputer 37 of the wireless center 2 is received by the first SS-CPU 54 of the SS transmission/reception unit 36. When the TV command 44 is control data including a control command for the SS transmission/reception unit 36, the first SS-CPU 54 performs a corresponding process.

When the TV command 44 transmitted by the wireless center microcomputer 37 is control data for the SS transmission/reception unit 61 or TV microcomputer 64 of the TV main body unit 103, the first SS-CPU 54 of the SS transmission/reception unit 36 performs a predetermined coding of the data, and then transmits by wireless the coded data via the SS wireless transmission/reception engine 53.

The SS transmission/reception unit 61 of the TV main body unit 103 receives the wireless data and discriminates control data by the second SS-CPU 84, and when the control data is for the SS transmission/reception unit 61, the second SS-CPU 84 performs a predetermined process.

When the received data is control data for the TV microcomputer 64, the second SS-CPU 84 transmits the control data as the TV command 71 to the TV microcomputer 64. As a result, the TV microcomputer 64 performs a predetermined process in the TV main body 3.

FIGS. 4(a) through 4(c) schematically illustrate transmission/reception of control data (referred to as a control command hereinafter) between the wireless center unit 102 and the TV main body unit 103.

Note that in FIGS. 4(a) through 4(c), a controlling device means the wireless center microcomputer 37 of the wireless center unit 102, a wireless station 1 means the SS transmission/reception unit 36 of the wireless center unit 102, a wireless station 2 means the SS transmission/reception unit 61 of the TV main body unit 103, and a controlled device means the TV microcomputer 64 of the TV main body unit 103.

FIG. 4(a) illustrates a case where the controlling device transmits control data having a control command directed to the wireless station 1 (own station) in the controlling device itself. This case is referred to as a first control data transmission/reception mode. In the first control data transmission/reception mode, it is conceivable that, for example, the wireless center microcomputer 37 transmits control data having a control command for changing an MPEG transmission rate or switching a wireless channel, to the SS transmission/reception unit 36, according to a wireless communication circumstance.

FIG. 4(b) illustrates a case where the controlling device transmits control data including a control command to the wireless station 2 (other station), which is different to the controlling device. This case is referred to as a second control data transmission/reception mode. In the second control data transmission/reception mode, it is conceivable that, for example, the wireless center microcomputer 37 transmits control data including a control command for changing the MPEG transmission rate or switching the wireless channel, to the SS transmission/reception unit 61 of the TV main body unit 103, according to a wireless communication circumstance.

FIG. 4(c) illustrates a case where the controlling device transmits control data including a control command to a controlled device, which is different to the controlling device. This case is referred to as a third control data transmission/reception mode. In the third control data transmission/reception mode, it is conceivable that, for example, the wireless center microcomputer 37 transmits control data including a control command for changing an inputted channel of a program or changing a variety of settings.

Further, opposite to the cases illustrated in FIGS. 4(a) through 4(c), in an example where the TV microcomputer 64 of the TV main body unit 103 is a controlling device and the wireless center microcomputer 37 of the wireless center unit 102 is a controlled device, it is conceivable that a control command for changing a tuner channel or audio setting is transmitted. This example is fully explained later.

13

Next, a data structure of control data transmitted/received in the present embodiment is explained. The wireless AV system 101 of the present embodiment makes it easy to discriminate control data, by transmitting/receiving the control data with a predetermined key code in a header part (control command) of the control data.

FIG. 5 illustrates an example of a key code included in control data. In the example illustrated in FIG. 5, a key code for discriminating control data is "0xFF". The key code is preset, and can be set arbitrarily. Further, when a code identical with the preset key code "0xFF" is included in a main body of the data, this code is converted according to a predetermined rule. Specifically, "0xFE" in the main body of the data is converted into "0xFE 0x00", and "0xFF" is converted into "0xFE 0x01".

With such a conversion, control data transmitted/received in the present system is easily discriminated with use of the key code "0xFF" included in the header.

Further, by converting "0xFE 0x00" into "0xFE" and "0xFE 0x01" into "0xFF" at a receiving-side of the control data, it is possible to easily restore the original control data.

FIG. 6 illustrates an example of a format of control data transmitted/received in the wireless AV system 101 of the present embodiment. As illustrated in FIG. 6, control data is constituted of a command discrimination ID (a control command including a key code), a data size, a main body of data (control command), and a checksum.

The command discrimination ID is predetermined as an ID for discriminating the destination to which the command is transmitted. In the present embodiment, a command for the wireless station (own station) is discriminated by ID=1, a command for the wireless station (other station) is discriminated by ID=2, and a command for a controlled device sent via the other station is discriminated by ID=3. Further, a command for an external device connected to the controlled device is discriminated by ID=4.

The checksum is a value (low 1 byte) calculated by adding values of a command discrimination ID, a data size, and a main body of data, using 1 byte as a unit.

FIGS. 7(a) through 7(d) illustrate examples of code conversions of control commands.

FIG. 7(a) illustrates an example of a conversion of the control command for the wireless station (own station) (control command for the wireless station 1). The command discrimination ID in this case is set to 1.

FIG. 7(b) illustrates an example of a conversion of the control command for the wireless station (other station) (control command for the wireless station 2). The command discrimination ID in this case is set to 2.

FIG. 7(c) illustrates an example of a conversion of the control command for the controlled device sent via the other station. The command discrimination ID in this case is set to 3.

FIG. 7(d) illustrates an example of a conversion of the control command for the external device connected to the controlled device. The command discrimination ID in this case is set to 4.

In the case of any command, the data after conversion includes a key code "0xFF" in the head of the data, and "0xFE" and "0xFF" in the data before conversion are converted into "0xFE 0x00" and "0xFE 0x01" respectively, so that the key code is not misidentified.

Here, concrete examples of a variety of control commands are described below.

14

Examples of own station commands (command discrimination ID=1) are,

Reception quality acquisition command: 0x01 0x00 0x01 0x01 0x03

Channel number acquisition command: 0x01 0x00 0x01 0x02 0x04

Examples of other-station commands (command discrimination ID=2) are,

Channel changing command: 0x02 0x00 0x01 0x01 0x04

Name of other-station device acquisition command: 0x02 0x00 0x01 0x02 0x05

Examples of commands for a device connected to the other-station (command discrimination ID=3) are,

Reproduction command: 0x03 0x00 0x02 0x00 0x01 0x06

Stop command: 0x03 0x00 0x02 0x00 0x02 0x07

Fast forward command: 0x03 0x00 0x02 0x00 0x03 0x08

Rewinding command: 0x03 0x00 0x02 0x00 0x04

In the examples illustrated in FIGS. 4(a) through 4(c), the controlling device is the wireless center microcomputer 37 of the wireless center unit 102, and the controlled device is the TV microcomputer 64 of the TV main body unit 103. On the other hand, it may be that the controlling device is the TV main body unit 103 and the controlled device is the wireless center unit 102. An example of this case is explained below, with respect to each purpose of each control command, with reference to FIGS. 8(a) and 8(b) through FIGS. 11(a) and (b).

Here, it is assumed that the controlling device is the TV microcomputer 64 of the TV main body unit 103, and that the wireless station 1 is the SS transmission/reception unit 61 of the TV main body unit 103. Further, it is assumed that the wireless station 2 is the SS transmission/reception unit 36 of the wireless center unit 102, and that the controlled device is the wireless center microcomputer 37 of the wireless center unit 102. It is assumed that the external device is an AV device (not shown) connected to the wireless center unit 102, such as a DVD recorder.

When acquisition of transmitted radio wave strength in the wireless station 1 is intended, the controlling device transmits control data to the wireless station 1, as illustrated in FIG. 8(a). In this case, the command discrimination ID=1, and the control data has a data structure illustrated in FIG. 8(b). Here, as illustrated in FIG. 7(a), the control command included in the control data is converted by the TV microcomputer 64, acting as the controlling device, of the TV main body unit 103.

Note that the control data illustrated in FIG. 8(b) includes a 1 byte control command (a control command after conversion, illustrated in FIG. 7(a)) corresponding to the command discrimination ID=1, 2 bytes of size data for indicating a size of a main body of the control data, 1 byte of data showing a main body of the data (a command number indicating acquisition of transmitted radio wave strength), and 1 byte of data (CRC) indicating a checksum.

When acquisition of received radio wave strength in the wireless station 1 is intended, the controlling device transmits control command to the wireless station 2 via the wireless station 1. In this case, the command discrimination ID=2, and the control data has a data structure illustrated in FIG. 9(b). Here, as illustrated in FIG. 7(b), the control command included in the control data is converted by the TV microcomputer 64, acting as the controlling device, of the TV main body unit 103.

Note that the control data illustrated in FIG. 9(b) includes a 1 byte control command (a control command after conversion, illustrated in FIG. 7(b)) corresponding to the command discrimination ID, 2 bytes of size data for indicating a size of the control data, 1 byte of data indicating a main body of the

15

data (a command number indicating acquisition of a received radio wave strength), and 1 byte of data (CRC) indicating a checksum.

When switching of an external input in the controlled device is intended, the controlling device transmits a control command to the controlled device via the wireless stations 1 and 2, as illustrated in FIG. 10(a). In this case, the command discrimination ID=3, and the control data has a data structure illustrated in FIG. 10(b). Here, as illustrated in FIG. 7(c), the control command included in the control data is converted by the TV microcomputer 64, acting as the controlling device, of the TV main body unit 103.

Note that the control data illustrated in FIG. 10(b) includes 1 byte of data corresponding to the command discrimination ID, 2 bytes of size data indicating a size of the control data, 1 byte of data indicating a main body of the data (a command number corresponding to input switching), data corresponding to a parameter indicating an external input 1, 1 byte of data (CRC) indicating a checksum.

When direct remote control of an external device via the controlled device is intended, the controlling device transmits a control command to the external device via the wireless stations 1 and 2 and the controlled device. In this case, the command discrimination ID=4, and the control data has a data structure illustrated in FIG. 11(b). Here, as illustrated in FIG. 7(d), the control command included in the control data is converted by the TV microcomputer 64, acting as the controlling device, of the TV main body unit 103.

Note that the control data illustrated in FIG. 11(b) includes 1 byte of data corresponding to the command discrimination ID, 2 bytes of data indicating a size of the control data (here, a main body of the data is 80 bytes), data indicating a main body of the data (a command number corresponding to a remote-control-issued function), data corresponding to a parameter indicating an IrDA sampling data message, and 1 byte of data (CRC) indicating a checksum.

As a concrete example of control command transmission, as illustrated in FIGS. 11(a) and 11(b), for example, the wireless AV system 101 illustrated in FIG. 12 is considered. Here, in the wireless AV system 101 illustrated in FIG. 12, it is possible to operate, using the remote controller 130, an external device such as a DVD player or a video deck connected to the wireless center unit 102, via the TV main body unit 103.

As an application of such a remote control operation, a system illustrated in FIG. 13 is conceivable. In FIG. 13, three TV main body units 103a through 103c transmit control data to one wireless center unit 102, and perform remote control of external devices (devices A through C) connected to the wireless center unit 102. Namely, the wireless center unit 102 transmits control data received from the TV main body unit 103 to remote control light receiving sections (110a through 110c) of the remotely controlled devices.

In this case, the control data is generated on the TV main body unit 103 side, transmitted from the TV main body unit 103 to the wireless center unit 102, and transmitted from the wireless center unit 102 to each of the external devices. A process for distributing the control data to the external devices is performed in the wireless center microcomputer 37 of the wireless center unit 102.

The wireless AV system 101 to which the wireless control system of the present invention is applied is explained above, with reference to concrete embodiments. However, the present invention is not limited to the embodiments. It is possible for a person with ordinary skill in the art to which the invention pertains, to perform a variety of changes or modifications to arrangements and functions of the invention

16

according to each of the embodiments or other embodiments, within the scope of the present invention.

For example, in the present embodiment, as a wireless AV device, a portable TV is exemplified. However, the present invention is not limited to a TV receiver, and is applicable to a device having a wireless communication function or to a device into which a wireless communication function is merged. For example, the AV device may be a VTR (Video Tape Recorder), or record reproducing device which stores a record in a HDD or DVD. Further, a device for transmission/reception of data may be a device in which a function for transmission/reception of data is merged with an information device function represented by a personal computer, and applicable to all the systems. Further, contents of transmitted/received data may be anything.

Further, in the present embodiment, the TV receiver is exemplified, but the present invention is not limited to this, and is applicable to a personal computer with a tuner, or to other AV devices using a tuner.

Further, kinds of each section constituting the wireless communication device and the wireless AV system, and kinds/styles of setting information or the like are not limited to the embodiments. Particularly, the present invention may be preferably applied to a device based on HAVI.

Further, as a tuner, two broadcasting tuners such as a BS tuner and a U/V tuner are exemplified, but kinds and numbers of broadcasting tuners are not limited to this. For example, a CS tuner may be used.

Further, in the present embodiment, names such as a wireless communication device and a wireless AV system are used, but these names are used for convenience of explanation, and they may be a wireless communication apparatus, an AV device, a broadcasting selecting device, or the like.

The wireless communication device and the wireless AV system as described above can be realized by a program for causing the wireless communication device and the wireless AV system to function. The program may be stored in a storage medium readable by a computer. In the present invention, the storage medium may be program media being a main memory itself, or program media readable by inserting a storage medium into a program reading device provided as an external storage device.

In either case, the stored program may be arranged so as to be carried out by access by a CPU. Alternatively, in either case, the program may be arranged so as to be read out, downloaded to a program storage area (not shown) and carried out. A program for downloading is stored in a main body of the device beforehand.

Here, the program media may be arranged so as to be a storage medium detachable from the main body, and be a medium permanently storing a program. For example, tapes such as a magnetic tape and a cassette tape, discs such as a magnetic disc (e.g. Floppy™ disc or a hard disc) or an optical disc (e.g. CD-ROM, MO, MD, or DVD), cards such as an IC card or an optical card, and semiconductor memories such as a mask ROM, EPROM, EEPROM, or flash ROM.

Further, when means (not shown) for connecting with an external communication network is provided, the program media may be arranged so as to be a medium for temporarily storing a program so as to download the program from a communication network via means for connecting with an external communication network.

Note that when a program is downloaded from the communication network in this way, a program for downloading may be stored in the main body of the device beforehand, or

may be installed from other storage media. Contents to be stored in the storage media are not limited to programs, and may be data.

Further, at present, new terrestrial digital broadcasting has been prepared, which will take the place of analog terrestrial broadcasting viewed across the country. The terrestrial digital broadcasting started in 2003 in three urban areas: Kanto, Kinki, and Tokai, and will spread across the country in 2006. Along with this spreading, current analog broadcasting will be abolished in 2011.

ISDB (Integrated Services Digital Broadcasting) is a concept of the next generation of integrated digital broadcasting that treats all information such as images, audio, and data items, as digital data items. As a concrete service of ISDB, digital TV broadcasting, digital audio broadcasting, facsimile broadcasting, multimedia broadcasting and the like are studied. As a transmission channel for ISDB, a satellite broadcast wave, a terrestrial broadcast wave, and a wired transmission channel such as a co-axial cable or an optical fiber are now considered.

Technical standard ISDB-T (Terrestrial) of the terrestrial digital broadcasting adopts OFDM (Orthogonal Frequency Division Multiplexing) that uses a number of carriers as a modulation method, and thereby allows reduction of ghosting caused by a plurality of transmission routes (multiple-paths) such as reflection from buildings. Further, ISDB-T defines a plurality of transmission modes, which define a carrier interval, a plurality of modulation methods with respect to each carrier, and a plurality of guard intervals in temporal axis directions provided with respect to each effective symbol length, and accordingly a large number of signal methods are allowed as standard. In practice, out of these methods, an optimal method is selected according to a service, such as fixed reception or mobile reception.

Further, in ISDB-T, one transmission channel (band is approximately 5.6 MHz) is divided into 13 segments (1 segment=approximately 430 kHz), and the modulation method is changed using this segment as a unit. As a result, a broadcasting station can determine a signal arrangement arbitrarily, such as audio broadcasting and high definition broadcasting in one channel, and standard fixed broadcasting and mobile broadcasting in another channel.

Further, ISDB-T adopts an interleave in a temporal direction, and a radio wave used for ISDB-T is suitable for transmission to a movable body. As such, ISDB-T allows stabilized reception even by a receiving device on a movable body, such as an in-vehicle TV, and a portable terminal such as a PDA (Personal Digital Assistant) or a mobile phone. In future, a service assuming such mobile reception is greatly expected.

Therefore, the wireless control system of the present invention can be preferably used for such services.

Further, the present invention may be arranged as follows.

The device according to the present invention may be arranged to be a device for transmitting/receiving control data among AV devices constituting the wireless AV system, including: means for generating control data; means for converting the generated control data; means for transmitting/receiving by wireless the converted control data; and means for discriminating the converted control data and acquiring the data before conversion.

Further, the means for converting the control data may be arranged so that the means adds a key code for discriminating the control data to a head part of the control data, and when data whose content is identical with the key code exists in another part of the control data, the means performs a predetermined conversion of the data.

Further, the control data may include: data by which the AV device constituting the wireless AV system controls a wireless communication station in the AV device itself; data by which the AV device controls a wireless communication station in an AV device other than the AV device itself; and data by which the AV device controls the AV device other than the AV device itself.

Further, the control data may include a command for changing a data transmission rate, changing a wireless communication channel, changing a tuner channel, and switching an input.

As described above, with the wireless AV system of the present invention, when transmission/reception of control data among the AV devices is performed, it is possible to discriminate control data according to a key code added to a header, without processing a main body of the data. As a result, it is possible to reduce the burden of data discrimination in a wireless station and a terminal.

The present invention is not limited to the embodiments, and a variety of modifications are possible within the scope of the following claims. That is, embodiments obtained by combining technical means suitably modified within the scope of the following claims are also within the technical scope of the present invention.

Each section of the wireless AV system 101 of the embodiments can be realized in such a manner that calculation means such as a CPU performs a program stored in storage means such as a ROM (Read Only Memory) or RAM, and controls input means such as a keyboard, output means such as a display, or communication means such as an interface circuit. Therefore, a computer having such means reads a storage medium for storing the program and carries out the program, and thereby a variety of functions and a variety of processes of the wireless AV system 101 of the present embodiment can be realized. Further, by storing the program in a removable storage medium, it is possible to realize a variety of the functions and a variety of the processes in an arbitrary computer.

The storage medium may be program media being a memory (not shown), such as a ROM, so as to be processed by a microcomputer, or program media readable by inserting a storage medium to a program reading device (not shown) provided as an external storage device.

In either case, it is preferable that the stored program is carried out by an access by a microprocessor. Further, it is preferable that the program is read out, downloaded to a program storage area of the microcomputer and carried out. A program for downloading is stored in the main body of the device beforehand.

Further, the program medium is a storage medium detachable from the main body, and permanently storing a program. For example, tapes such as a magnetic tape and a cassette tape, discs such as a magnetic disc (e.g. a flexible disc or a hard disc) or an optical disc (e.g. CD, MO, MD, or DVD), cards such as an IC card (including a memory card), and semiconductor memories such as a masked ROM, EPROM (Erasable Programmable Read Only Memory), EEPROM (Electrically Erasable Programmable Read Only Memory), or flash ROM.

Further, when it is possible to connect the system with a communication network including the Internet, it is preferable that the program media is a medium for temporarily storing a program so as to download the program from the communication network.

Further, when a program is downloaded from the communication network in this way, it is preferable that a program for downloading is stored in the main body of the device beforehand, or installed from other storage media.

19

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

INDUSTRIAL APPLICABILITY

The wireless system of the present invention is preferably used for a home AV network system (e.g. a wireless TV receiver having a separable display) that transmits image and/or audio data by wireless. However, the wireless system of the present invention is not limited to this, and is widely applicable for a wireless communication device such as a mobile phone/PHS (Personal Handy-Phone System)™ or a portable information terminal (PDA (Personal Digital Assistant)).

The invention claimed is:

1. A wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,
 - wherein the controlling device wirelessly generates and transmits control data to the controlled devices, the control data including (i) a control command and (ii) a discrimination code for discriminating which of the controlled devices in the system the control command is for, and
 - the controlled devices receive the wirelessly transmitted control data from the controlling device, read out the discrimination code included in the control data, and discriminating which of the a controlled device in the system the control command is for, the control data being transmitted to a controlled device discriminated by the discrimination section,
 - wherein the control command includes one of a first command, a second command, and a third command,
 - the first command includes a reception quality acquisition command and a channel number acquisition command,
 - the second command includes a channel changing command and a name of other-station device acquisition command, and
 - the third command includes a reproduction command, a stop command, a fast forward command, and a rewinding command, wherein
 - the first command is control data transmitted to a first controlled device by the controlling device;
 - the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and
 - the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.
2. A wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,
 - wherein the controlling device includes:
 - a control data generating section for generating control data including (i) a control command and (ii) a discrimination code for discriminating which of the controlled devices in the system the control command is for; and
 - a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication, and

20

wherein each of the controlled devices includes:

- a wireless communication section for receiving the control data from the controlling device;
 - a discrimination section for reading out the discrimination code included in the received control data, and discriminating which of the controlled devices the control command included in the control data is for; and
 - a control data transmission section for transmitting the control data to a controlled device discriminated by the discrimination section,
- wherein, when generated control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.
3. The wireless control system as set forth in claim 2, wherein control data generated in the control data generating section is any one of control data to be transmitted to a control section included in the controlling device, control data to be transmitted to the wireless communication section in the controlling device, control data to be transmitted to a control section included in the controlled devices, and control data to be transmitted to the wireless communication section in the controlled devices.
 4. The wireless control system as set forth in claim 2, wherein the wireless communication section transmits control data using a spread spectrum wireless system.
 5. The wireless control system as set forth in claim 2, wherein the wireless communication section performs low power, close range, two-way wireless communication such as a wireless LAN, Bluetooth or UWB (Ultra Wide Band).
 6. The wireless control system according to claim 2, wherein, when the predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.
 7. A wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,
 - wherein the controlling device includes:
 - a control data generating section for generating control data including (i) a control command and (ii) a discrimination code for discriminating which of the controlled devices in the system the control command is for; and
 - a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication, and
 - wherein each of the controlled devices includes:
 - a wireless communication section for receiving the control data from the controlling device;
 - a discrimination section for reading out the discrimination code included in the received control data, and discriminating which of the controlled devices the control command included in the control data is for; and
 - a control data transmission section for transmitting the control data to a controlled device discriminated by the discrimination section,
 - wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and
 - wherein, when generated control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the

21

same data, and transmits the converted control data to the wireless communication section.

8. Controlled devices, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlled devices (i) receiving control data which includes a discrimination code for discriminating between the controlled devices in the system, and (ii) discriminating a controlled device to carry out a control command included in the control data, based on the discrimination code included in the received control data,

wherein the control command includes one of a first command, a second command, and a third command,

the first command includes a reception quality acquisition command and a channel number acquisition command,

the second command includes a channel changing command and a name of other-station device acquisition command, and

the third command includes a reproduction command, a stop command, a fast forward command, and a rewinding command, wherein

the first command is control data transmitted to a first controlled device by the controlling device;

the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and

the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.

9. The wireless control system according to claim 8, wherein, when a predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

10. Controlled devices, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlled devices including:

a wireless communication section for receiving from the controlling device control data including a discrimination code for discriminating between the controlled devices in the system;

a discrimination section for reading out the discrimination code included in the received control data and discriminating a controlled device to carry out a control command included in the control data; and

a control data transmission section for transmitting the control data to the controlled device discriminated by the discrimination section,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

22

11. A controlling device, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlling device wirelessly transmitting control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

12. A controlling device, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlling device including:

a control data generating section for generating control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system; and

a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication,

wherein, when generated control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

13. The wireless control system according to claim 12, wherein, when the predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

14. A method of controlling devices, in which a controlling device wirelessly controls controlled devices,

wherein the controlling device wirelessly transmits control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, and

the controlled devices receive the control data wirelessly transmitted from the controlling device, and, based on the discrimination code included in the received control data, discriminate a controlled device to carry out the control command included in the control data, and transmit the control data to the discriminated controlled device,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication chan-

23

nel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and wherein, when the control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

15. The method of controlling devices according to claim 14, wherein, when the predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

16. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

receiving control data which includes a discrimination code for discriminating between controlled devices in a system, and (ii) discriminating a controlled device to carry out a control command included in the control data, based on the discrimination code included in the received control data,

wherein the control command includes one of a first command, a second command, and a third command, the first command includes a reception quality acquisition command and a channel number acquisition command,

the second command includes a channel changing command and a name of other-station device acquisition command, and

the third command includes a reproduction command, a stop command, a fast forward command, and a rewinding command, wherein

the first command is control data transmitted to a first controlled device by the controlling device;

the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and

the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.

17. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

receiving control data including a discrimination code for discriminating between controlled devices in a system;

24

reading out the discrimination code included in the received control data and discriminating a controlled device to carry out a control command included in the control data; and transmitting the control data to the controlled device discriminated.

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, a predetermined conversion of the same data is preformed, and the converted control data is transmitted.

18. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

transmitting control data to controlled devices, the control data having, in a control command for controlling a controlled device, a discrimination code for discriminating between the controlled device to which the control command is to be transmitted and other one or more controlled devices in a system,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, a predetermined conversion of the same data is preformed, and the converted control data is transmitted.

19. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

generating control data having, in a control command for controlling controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in a system; and

transmitting the control data to a controlled device, wherein, when generated control data includes same data as a predetermined key code, performing a predetermined conversion of the same data and transmitting the converted control data.

* * * * *

Under the Paperwork reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheet(s) as necessary)

Sheet	1	of	1
-------	---	----	---

Complete if Known

Application Number	Not Yet Assigned
Filing Date	10-14-05
First Named Inventor	Kenji Sakamoto
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	1248-0819PUS

U.S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

Examiner Signature	Date Considered
-----------------------	--------------------

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include this form with next communication to applicant.

1. Applicant's unique citation designation number (optional) 2. See Kinds codes of USPTO patent Documents, at www.uspto.gov or MPEP 901.04.

3. Applicant's Unique Document Identification Number (UDID) is required. 4. For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5. Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST/16 if possible. 6. Applicant is to place a check mark here if English language Translation is attached.

16 If possible, b. Applicant is to place a checkmark next to if English language translation is submitted.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450 Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.

SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Japanese Patent Application Publication
Tokukaihei No. 2-226898 A (1990)

The following is a partial English translation of exemplary portions of non-English language information that may be relevant to the issue of patentability of the claims of the present application.

An operation code outputted from the remote controller which code is for the television receiver 1 has a different header from that of an operation code for the VTR 2. The microprocessors 10 and 11 include a function for identifying whether or not the operation code is for its own device, based on the header. The operation codes of the television receiver 1 and the VTR 2 are both inputted from the light receiving element 8 of the television receiver 1; the microprocessor 10 first identifies based on the header whether or not the inputted operation code is for the television receiver 1. When the operation code is for the television receiver 1, the microprocessor 10 causes the television receiver 1 to operate in accordance with the operation code. However, if the operation code is not for the television receiver 1, the microprocessor 10 sends this operation code to the microprocessor 11 of the VTR 2 via the system cable 3. The microprocessor 11 then identifies based on the header that the operation code is for the VTR 2, and causes operation of the VTR 2 in accordance with the operation code.

The microprocessor 11 includes a program that (i) identifies the operation code and (ii) operates the VTR 2 in accordance with the operation code. Furthermore, this program also has a function to generate an operation code for the television receiver 1, which is required for causing the television receiver 1 to link with the VTR 2. The operation code for linking

the television receiver 1 with the VTR 2 is inputted from the light receiving element 8 as a code for the VTR 2, and once the microprocessor 11 receives this operation code, not only does the microprocessor 11 cause the VTR 2 to operate in accordance with the operation code, but also the microprocessor 11 simultaneously generates the operation code for the television receiver 1 and sends this to the microprocessor 10 via the system cable 3. The microprocessor 10 identifies this operation code, and causes the television receiver 1 to operate in accordance with the operation code.

⑫ 公開特許公報(A) 平2-226898

⑬ Int. Cl.⁸

識別記号

庁内整理番号

⑭ 公開 平成2年(1990)9月10日

H 04 Q 9/00
H 04 B 1/034
H 04 N 5/00

3 0 1 E
C
A

6945-5K
8020-5K
6940-5C

審査請求 未請求 請求項の数 7 (全7頁)

⑮ 発明の名称 AVコントロールシステム

⑯ 特 願 平1-45296

⑰ 出 願 平1(1989)2月28日

⑱ 発 明 者 吉 野 正 則 茨城県勝田市大字福田1410番地 株式会社日立製作所東海工場内

⑲ 出 願 人 株式会社日立製作所 東京都千代田区神田駿河台4丁目6番地

⑳ 代 理 人 弁理士 武 須次郎 外1名

明 細 書

1. 発明の名称

AVコントロールシステム

2. 特許請求の範囲

1. AV機器間を双方向通信を可能にシステムケーブルで接続し、該AV機器夫々の電源のオン/オフを含む各種操作のための操作コードの入力手段を1つの特定の該AV機器の操作コード入力手段とし、かつ所望の該AV機器での所定の該操作コードの受信とともに該所望のAV機器からこれに連動すべき他の所望の該AV機器に該システムケーブルを介して連動させるに必要な該操作コードを送信し、該AV機器夫々の電源オン/オフを含む各種操作を可能に構成したことを特徴とするAVシステム。
2. 請求項1において、前記操作コードはリモートコントロールユニットから出力され、かつ前記AV機器毎に前記操作コードのヘンダーが異なることを特徴とするAVシステム。

3. 請求項2において、前記AV機器は、夫々前記ヘンダーによつて自己の前記操作コードを識別し、該自己の操作コードに応じて他の前記AV機器の操作コードを前記システムケーブルを介して出力可能としたことを特徴とするAVシステム。

4. 請求項1、2または3において、前記システムケーブルは取りはずし可能であつて、前記AV機器は夫々、前記システムケーブルが取りはずされているとき、単独に操作可能であることを特徴とするAVコントロールシステム。

5. 請求項1、2、3または4において、前記特定のAV機器はテレビジョン受像機であつて、他の前記AV機器の1つはビデオテープレコーダであることを特徴とするAVコントロールシステム。

6. 請求項5において、前記ビデオテープレコーダの電源をオンする前記操作コードの入力により、前記ビデオテープレコーダとともに前記テレビジョン受像機が電源オンすることを特徴と

するA/Vコントロールシステム。

7. 請求項5において、前記ビデオテープレコーダのタイマによる電源のオン、オフに連動して前記テレビジョン受像機の電源がオン、オフすることを特徴とするA/Vコントロールシステム。

3. 発明の詳細な説明

【産業上の利用分野】

本発明は、テレビジョン受像機、VTR、衛星放送受信チューナ（BSチューナ）を含むA/V機器に用いて好適なA/Vコントロールシステムに関する。

【従来の技術】

従来、テレビジョン受像機、VTRなどの機器にはリモートコントロールユニット（以下、リモコンという）が付属しており、電源のオン/オフも含む各種動作をリモコンを操作することによって選択的に行なわせることができる。これにより、機器を、それ自体に設けられている操作部を操作することなく、これから離れた位置から操作することができて便利になっている。

ればならず、テレビジョン受像機とVTRとがともに電源オンしたとき、テレビジョン受像機の入力切替がVTR側になるだけである。

本発明の目的は、かかる問題点を解消し、各種A/V機器からなるシステムでの各機器の操作を簡略化し、使い勝手が大幅に向上したA/Vコントロールシステムを提供することにある。

【課題を解決するための手段】

上記目的を達成するために、本発明は、複数のA/V機器間を双方向通信を可能にシステムケーブルで接続し、各A/V機器の電源のオン/オフを含む各種操作のための操作コードを1つの特定の該A/V機器から入力し、かつ該操作コードによる所望の該A/V機器の電源オンとともに、該所望のA/V機器からこれに連動すべき他の所望のA/V機器に該システムケーブルを介して電源をオンするための操作コードを送信するように構成する。

【作用】

特定のA/V機器から入力された操作コードを所望した所望のA/V機器は、この操作コードに応じ

【発明が解決しようとする課題】

しかしながら、これら従来の機器においては、夫々が個々に操作されなければ動作しないように構成されているために、複数の機器を動作させて使用する場合、これら機器毎に操作しなければならず、操作が煩雑となつて手間がかかるという問題があつた。

たとえば、VTRの再生面をテレビジョン受像機で表示する場合をみると、夫々を動作させるためには夫々に対して操作することが必要であるから、

- (1) テレビジョン受像機の電源をオンする。
- (2) VTRの電源をオンする。
- (3) テレビジョン受像機の入力切替をする。
- (4) VTRを再生モードにする。

の一連の操作が最低必要となる。

テレビジョン受像機とVTRとを単一のリモコンによって操作することができるようにしたA/Vコントロールシステムも開発されているが、これも電源のオン/オフは夫々の機器毎に操作しな

た動作を開始するが、VTRとテレビジョン受像機のように連動すべき複数のA/V機器に対しては、所望のA/V機器が操作コードによって電源オンすると、これからシステムケーブルを介して連動すべき他の所望のA/V機器に電源をオンすべき操作コードを送る。これによつて、所望のA/V機器に対する電源オンの操作のみで、これに連動すべき他のA/V機器の全てが電源オンとなる。

【実施例】

以下、本発明の実施例を圖面によつて説明する。

第1図～第3図は本発明によるA/Vコントロールシステムの一実施例を示すものであつて、第1図は全体構成図、第2図は操作コードの入力部の一具体例を示す図、第3図は操作コードの送信系を示す図であり、1はテレビジョン受像機、2はVTR、3はシステムケーブル、4はビデオ伝送線、5はオーディオ伝送線、6はアンテナ、7は受光部、8、9は受光素子、10、11はマイクプロセッサである。

第1図において、従来のように、夫々個々に操

作が可能なテレビジョン受像機1とVTR2とはビデオ伝送線4とオーディオ伝送線5とで接続されており、VTR2の録画モードでは、アンテナ6で受信された番組が録画される。再生モードでは、再生される番組のビデオ信号がビデオ伝送線4を介し、オーディオ信号がオーディオ伝送線5を介して夫々テレビジョン受像機1に伝送され、再生される番組の画像が表示されて音声が出力される。

この実施例では、さらに、テレビジョン受像機1、VTR2間がシステムケーブル3で接続可能となっている。これら間がシステムケーブル3で接続されていないときには、従来と同様、これらテレビジョン受像機1とVTR2とはリモコンによつて種々に操作されなければならないが、これら間がシステムケーブル3で接続されたときには、これらテレビジョン受像機1とVTR2とをリモコンで操作する場合、そのための操作コードがテレビジョン受像機1側から入力され、VTR2の操作のための操作コードはテレビジョン受像機1

からシステムケーブル3を介してVTR2に供給される。

第2図に示すように、テレビジョン受像機1の前面には受光部7が設けられ、リモコンが発信する操作コードで制御された赤外線がこの受光部7で受光されることにより、操作コードがテレビジョン受像機1から入力される。勿論VTR2にも同様の受光部が設けられているが(図示せず)、テレビジョン受像機1とVTR2とがシステムケーブルで接続されているときには、VTR2のこの受光部からの操作コードの入力は禁止される。

但し、テレビジョン受像機1とVTR2は、システムケーブル3で接続されていても、夫々に設けられた操作部により、夫々単独に操作することができる。

次に、第3図において、テレビジョン受像機1にはそれを動作させるためのマイクロプロセッサ10が、また、VTR2にはそれを動作させるためのマイクロプロセッサ11が夫々設けられている。マイクロプロセッサ10は、テレビジョン受像機1の

受光部7(第2図)における受光素子8がリモコンからの赤外線を受光することによつて受信された操作コードがテレビジョン受像機1の操作部によつて入力される操作コードを取り込み、このテレビジョン受像機1にこの取り込んだ操作コードに応じた動作を行なわせる。VTR2のマイクロプロセッサ11も同様であり、受光素子9からリモコンからの赤外線を受光することによつて入力される操作コードやVTR2の操作部によつて入力される操作コードを取り込み、VTR2にこの取り込んだ操作コードに応じた動作を行なわせる。

システムケーブル3はこれらマイクロプロセッサ10、11間を接続し、これら間で操作コードの双方向通信を可能とする。また、システムケーブル3が接続されると、VTR2のマイクロプロセッサ11は受光素子9による操作コードの入力を禁止する。

一方、リモコンから出力される操作コードは、テレビジョン受像機1に対するものとVTR2に対するものとでヘッダーを異にしており、マイク

ロプロセッサ10、11は夫々このヘッダーでもつて自己に対する操作コードであるかを識別する機能を有している。そこで、テレビジョン受像機1とVTR2との操作コードはいずれもテレビジョン受像機1の受光素子8から入力されるが、まず、マイクロプロセッサ10で入力された操作コードがテレビジョン受像機1に対するものかをそのヘッダーによつて識別される。この操作コードがテレビジョン受像機1に対するものであるときには、マイクロプロセッサ10はテレビジョン受像機1をこの操作コードに応じて動作させるが、この操作コードがテレビジョン受像機1に対するものでないとき、マイクロプロセッサ10はこの操作コードをシステムケーブル3を介してVTR2のマイクロプロセッサ11に送る。そこで、このマイクロプロセッサ11は、この送られてきた操作コードがVTR2に対するものであることをそのヘッダーによつて識別し、VTR2をこの操作コードに応じて動作させる。

マイクロプロセッサ11は、操作コードの識別や

VTR2を操作コードに応じて動作させるプログラムを有しているが、このプログラムにより、テレビジョン受像機1をVTR2と連動させるに必要なテレビジョン受像機1に対する操作コードの再生機能も有している。テレビジョン受像機1とVTR2を連動させるための操作コードはVTR2に対するものとして受光素子8から入力されるが、マイクロプロセッサ11はこの操作コードを取り込むと、この操作コードに応じてVTR2を動作させるが、これと同時に、テレビジョン受像機1に対する操作コードを作成し、システムケーブル3を介してマイクロプロセッサ10に送る。マイクロプロセッサ10はこの操作コードを識別し、この操作コードに応じてテレビジョン受像機1を動作させる。

そこで、テレビジョン受像機1とVTR2とが電源オフの状態でVTR2の電源をオンする操作をリモコンで行なうと、このための操作コードが受光素子8からマイクロプロセッサ10、システムケーブル3を介してマイクロプロセッサ11に供給

され、VTR2が電源オンされる。これとともに、マイクロプロセッサ11はテレビジョン受像機1を電源オンする操作コードとテレビジョン受像機1の入力をVTR2側に切替える操作コードとを作成し、システムケーブル3を介してマイクロプロセッサ10に送る。これにより、テレビジョン受像機1は電源オンされ、さらに、VTR2側への入力切替えが行なわれて、VTR2のアンテナ6(第1図)で受信される番組が表示される。その後、リモコンで録画操作が行なわれると、これによる操作コードがテレビジョン受像機1、システムケーブル3を介してマイクロプロセッサ11に供給され、VTR2でアンテナ6による受信番組の録画が行なわれるし、また、リモコンで再生操作が行なわれると、同様にして、VTR2で再生が行なわれて再生番組がテレビジョン受像機1で表示される。濃度しや早送りなどの各モード設定のための操作コードや、VTR2のチューナでのチューニングのための操作コードなど各種内容の操作コードもテレビジョン受像機1を介してVTR2に

送られる。

このようにして、リモコンからの操作コードによつてテレビジョン受像機1やVTR2の動作状態が切換えられるが、VTR2にオフタイマ(設定された時刻での自動再生終了機能)のセットに対しても、マイクロプロセッサ11はテレビジョン受像機1を電源オンさせる操作コードも作成する。これにより、VTR2にオフタイマがセットされていると、内蔵のタイマによつてVTR2がオフする時刻が検出されたとき、マイクロプロセッサ11は、VTR2を停止モードとして電源をオフするとともに、テレビジョン受像機1を電源オフする操作コードを作成し、システムケーブル3を介してマイクロプロセッサ10に送る。これにより、テレビジョン受像機1は電源オフする。

なお、VTR2を電源オンしただけではテレビジョン受像機1は電源オンせず、VTR2が待機モードや各種再生モードに設定されたとき、テレビジョン受像機1が電源オンされて入力がVTR2側に切替えられるようにしてもよい。但し、テ

レビジョン受像機1では、リモコンによる電源のオン、オフを単独に行なえることは、マイクロプロセッサ10の操作コードによる上記動作から明らかである。また、上記の説明から明らかなように、テレビジョン受像機1が電源オンしているか否かにかかわらず、リモコンからの操作コードによつてVTR2が電源オンすると、テレビジョン受像機1はVTR2側への入力切替えが行なわれる。

マイクロプロセッサ11は、マイクロプロセッサ10からの操作コードを取り込むと、その旨の応答信号をマイクロプロセッサ10に送り、また、マイクロプロセッサ10は、マイクロプロセッサ11からの操作コードを取り込むと、その旨の応答信号をマイクロプロセッサ11に送る。これらマイクロプロセッサ10、11は、応答信号がないときには繰り返し操作コードを送るが、この繰り返し回数は操作コードの内容に応じて異なり、この規定する回数だけ繰り返し操作コードを送っても応答信号がないときには、この操作コードの送信を中止する。

そこで、テレビジョン受像機1とVTR2とが

システムケーブル3で接続されていないとき、誤ってリモコンからのテレビジョン受像機1に対する操作コードをVTR2の受光素子9から入力したとすると、このときにはマイクロプロセッサ11は受光素子9から入力される操作コードを取り込むので、マイクロプロセッサ11は取り込んだ操作コードがテレビジョン受像機1に対するものと識別してシステムケーブル3の接続端子に出力する。しかし、システムケーブル3が接続されていないために、この操作コードを取り込んだという応答信号がなく、マイクロプロセッサ11は繰り返し同一操作コードを出力する。規定回数操作コードを出力しても応答信号がないと、マイクロプロセッサ11はシステムケーブル3でテレビジョン受像機1が接続されていないと判定し、この操作コードの出力を停止する。

第4図は本発明によるAVコントロールシステムの他の実施例を示すブロック図であつて、12はAVコントロールアンプ、13はVTR、14はテレビジョン受像機、15はBSチューナであ

コードは全てテレビジョン受像機14に入力され、システムケーブル3bを介してAVコントロールアンプ12に供給されて処理された後、システムケーブル3a、3b、3cを介してVTR13、テレビジョン受像機14、BSチューナ15に供給される。ここで、AVコントロールアンプ12は夫々の機器をコントロールする機能を有しており、各機器の出力を一旦入力し、これを所望の機種に出力するスイッチとしての役割を果たすものである。このために、この出力を供給しようとする機器に対するヘッダーと入力された操作コードを含む制御信号を出力する。これにより、VTR13、テレビジョン受像機14、BSチューナ15などは、夫々マイクロプロセッサでヘッダーから自己に対する操作コードであるか否かを識別し、自己の操作コードであるときには、この操作コードに応じた動作を行なう。

また、VTR13やBSチューナ15では、その動作に連動してテレビジョン受像機14などの他のAV機器を動作させる必要がある場合、この

る。

第1図～第3図に示した実施例は1台のテレビジョン受像機と1台のVTRとからなるAVシステムに関するものであつたが、第4図に示す実施例は3個以上のAV機器からなるAVシステムに関するものである。ここでは、VTR、テレビジョン受像機、BSチューナからなるAVシステムとしているが、これら以外のAV機器がさらに追加されても同様である。

第4図において、VTR13、テレビジョン受像機14、BSチューナ15は夫々システムケーブル3a、3b、3cによつてAVコントロールアンプ12に接続されている。これらVTR13、テレビジョン受像機14、BSチューナ15は、夫々第3図で説明したようなマイクロプロセッサやリモコンからの赤外光の受光部を備えている。

図示するようにシステムケーブル3a、3b、3cが接続されているときには、先の実施例と同様に、VTR13、テレビジョン受像機14、BSチューナ15夫々に対するリモコンからの操作

値のAV機器に対する操作コードを作成して送信する。これにより、AVコントロールアンプ12の上記の機能により、BSチューナ15を動作させると同時に、VTR13を再生モードとした場合、VTR13の再生出力でテレビジョン受像機14を画像表示し、BSチューナ15の音声信号で音声を出させるというようなことも行なわせることができる。

第5図は第4図におけるAVコントロールアンプ12と各システムケーブルとの接続手段の一品体例を示す図であつて、16は差込口、17a、17bはプラグ、18a、18bは差込口であり、第4図に対応する部分には同一番号をつけている。

同図において、システムケーブル3aの端部にはプラグ17aが設けられ、システムケーブル3bの端部にもプラグ17bが設けられている。これらプラグ17a、17bはAVコントロールアンプ12に設けられた差込口18に差し込むことができ、これに差し込むことによつてシステムケーブル3a、3bがAVコントロールアンプ12

に接続される。

また、各プラグ17a、17bにも差込口18a、18bが設けられている。プラグ17bはプラグ17aの差込口18aに差し込むことができ、これによつて、システムケーブル3aにシステムケーブル3bが接続される。逆に、プラグ17aもプラグ17bの差込口18bに差し込むことができ、これによつてシステムケーブル3aがシステムケーブル3bに接続される。

第4図のBSチューナ15などの他のAV機器に接続されるシステムケーブルの端部にも、同様のプラグが設けられており、全てのシステムケーブルが互いに接続可能である。

そこで、第5図において、システムケーブル3aのプラグ17aをAVコントロールアンプ12の差込口16に差し込み、このプラグ17aの差込口18aにシステムケーブル3bのプラグ17bを差し込み、以下順次各システムケーブルのプラグを差し込んでいくことにより、各AV機器がAVコントロールアンプ12に接続される。

【発明の効果】

以上説明したように、本発明によれば、連動すべき複数のAV機器を単一の操作でもつて連動動作させることが可能となり、AVシステムの操作を簡略化して使い勝手が大幅に向上する。

4. 図面の簡単な説明

第1図～第3図は本発明によるAVコントロールシステムの一実施例を示すものであつて、第1図は全体構成図、第2図は操作コードの入力部の一具体例を示す図、第3図は操作コードの送信系を示す図、第4図は本発明によるAVコントロールシステムの他の実施例を示すブロック図、第5図は第4図におけるAVコントロールアンプと各システムケーブルとの接続手段の一具体例を示す図である。

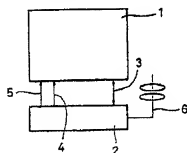
1……テレビジョン受像機、2……VTR、3、3a、3b、3c……システムケーブル、7……受光部、8、9……受光素子、10、11……マイクロプロセサ、12……AVコントロールアンプ、13……VTR、14……テレビジョン受像

機、15……BSチューナ。

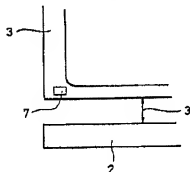
代理人 弁理士 武 隈次郎 (外1名)



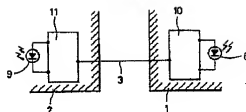
第1図



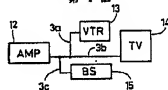
第2図



第 3 図



第 4 図



第 5 図

